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Impact assessment on water quality by the outfall effluent coming out from a fertilizer factory

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ABSTRACT

The impact of NFL of Vijapur outfall effluent on the physiochemistry of Chopan and Parvati river was investigated during the sampling period of fourteen month. The outfall effluent discharges into Chopan river which ultimately join to Parvati river, both river water sample were collected. The physico chemical parameter's analyzed for all samples included temperature, pH, T/Cl^-, TDS, turbidity DO, BOD, COD, T/PO_4^{3-}, F/NH_3, TS, SS, T/NH_3- N, conductivity, total hardness, urea, chloride and the sulphate of the NFL of Vijapur outfall effluent above the IS and WHO standards reflect the poor effluent quality generated by fertilizer plant.

Key words: Industrialization, fertilizer, Chopan and Parvati river, outfall effluent, pollution, physico-chemical parameteres.

INTRODUCTION

The impact of industrial toxics and Hazardous wastes on living organism cannot be over stressed. Consequently, upon the Industrial revolution, many production and manufacturing companies have due to improper waste management techniques, added toxic and Hazardous wastes into the aquatic environment. These wastes are also discharged into water without any treatment as a result of improper or deliberate channeling of the wastes in to aquatic environment. The presence of these wastes in the environment causes extensive damage to the water quality characteristics and the ecology of the environment.

The present investigation involves the analysis of surface water of chopan and parvati river near Vijaypur fertilizer plant district Guna (M.P.) India. Because of the outfall effluent of NFL discharges into both river.

Methodology

Study Area

The study was carrie dout at station of Chopan and Parvati river about 5 km. distance around to Vijaypur NFl Guna (M.P.) India, included outfall effluent of NF before mixed into both river.

River paravati flows on the western side about 4 kms away from the plant draining from south to north rianfed Chopan river which ultimately drains into river Parvati, flows 2 km. away from the plant on the Northern side. Both rivers are main wastes water (outfall effluent) receiving body of Industrial outfall effluent of Vijapur fertilizer plant. The area of study lying between latitude 77° to 77 ° 15' and longitude to 24° 15' to 24° 40'.

Water samples were collected cross sectionally from different par tof study area including outfall effluent on NFL before mixed into river (outfall effluent A_1, Chopan river B_2 to B_5 Parvati river C_6 to

Table 1: Observed value of Samples of different water quality parameter's with their IS and WHO standard

S. No.	Parameters Mg/l	Sampling Point A_1	B_2	B_3	B_4	B_5	C_6	C_7	C_8	Indian Standard	WHO Standard
1	Temperature	-	24	20	21	23	22	23	21	40°C Not more than	-
2	Turbidity (NTU)	9.8	3.1	6.4	3.9	2.8	3	8.7	5.8	-	5
3	pH	9.1	7.9	8.5	8.7	8.1	7.8	8	7.7	5.5-9	7.0-8.5
4	Conductivity (MS/CS)	0.728	0.48	0.50	0.45	0.51	0.49	0.53	0.49	-	0.300
5	TS	2619	479	567	637	480	368	481	410	-	-
6	TDS	2578	401	570	611	499	313	449	380	2100	500.0
7	SS	48	11.2	15.5	16.1	13.5	8.2	9.9	10.1	100	-
8	Total Hardness	285	208	250	199	320	188	217	201	-	100.0
9	DO	-	8.9	10.5	11.5	13.3	9.3	9.2	9.0	-	5.0
10	BOD	48	100.0	16.0	18.0	14.3	8.1	9.1	7.5	30	6.0
11	COD	185	15.9	30.5	18.5	20.5	15.6	18.9	10.5	250	10.0
12	T/NH_3-N	409	10.7	16.5	15.7	18.8	8.9	7.8	9.5	50	0.5
13	F/NH_3	35.5	26.5	29.1	35.2	22.8	10.5	ND	6.8	5	-
14	Nitrate	48	16.5	18.9	21.1	15.8	8.5	9.3	9.0	-	-
15	Urea	45	2.5	5.6	3.5	ND	0.8	0.15	ND	-	-
16	T/PO_4^{-3}	105	7.9	9.5	7.8	8.5	4.5	ND	5.5	5	-
17	Chloride	141	13.5	14.1	38.1	35.2	20.5	27.5	ND	1000	200.0
18	Sulphate	89	19.5	88.1	ND	45.6	31.5	60.1	40.5	1000	200.0

Note : All value Mg/L except pH, temperature and turbidity and conductivity.

A = NFL effluent B = Chopan river and C = Parvati Rive.

C_8). However different parameter's were studied by standard method (AAPHA 1995, AWWA 1989, Goel 1986 and Vogel 1978, WPCF). Samples were carried out immediately in the laboratory. Care had been taken for the detection of BOD so that samples bottle are immediately wrapped with black paper. BOD is determined at the rate of 5 days from the collection of samples[1].

The water quality parameter's (WQPS) of outfall effluent of NFL and rivers were analyzed in this study as temperature by using mercury thermometer[2], turbidity by Nepehlometer (NTU)[3], conductivity by digital conductometer (systronic Model No. 304)[4]. TH by complexometric titration (EDTA) 5, urea by spectrophotometric method[6], Do by wingkler's method (Iodometric)[7], chloride by Argentometry (mohr's method)[8], pH by digital pH meter[9], free Ammonia by the direct titration method[10], Phosphate by spectrophotometric method[11], TDS by evaporation method[12] and sulphate by Nephrleometry[13].

RESULTS AND DISCUSSION

Result of the water quality parameters (WQPs) of the NFL outfall effluent and rivers water during the fourteen month sampling period of study area and IS, WHO standard for outfall effluent of Industry for comparison are as shown in table-1. Apart from SS, chloride and sulphate the NFL outfall effluent recorded the highest concentration for all the water quality physico-chemical parameters measured, with the exception of temperature, DO, sulphate and chloride the concentration of all other parameters of the NFL outfall effluent are higher than the IS and WHO standard generally expect for conductivity TDS (Remaining to B_3 and B_4 point), BOD, COD chloride and sulphate. River water also recorded higher concentration for all the physico-chemical parameters in Chopan and Parvati River. The result generally revealed a gradual mixing of the constituent of the NFL outfall effluent quality is poor and contain high concentration of Inorganic constituents (Such as T/PO_4^{3-}, T/Cl, urea, F/NH_3 and sulphate) which were above the acceptable standard (IS and WHO) limits.

CONCLUSION

Based on the data depicting the base line status and data collected after the commissioning of he plant, it concluded that the liquid effluent from NFL being discharged into river Chopan which ultimately join to Parvati river do have a very marginal impact on the river water quality. Causing major variation in the physical and chemical characteristics. However the self purification capacity and dilution factor are taking care of the potential pollutional problems.

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